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POLARPAM

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Cover - Over Great Bear Lake

Hon. Jean Chrétien, Minister of Indian Affairs and Northern Development

While Canada's Northland may be distant from Cape Kennedy, it is nevertheless no less exciting than the base from where within the near future a manned spaceship will leave for the moon.

The Yukon and the Northwest Territories, the last frontiers on the North American continent, hold just as great challenges and rewards as the exciting prospects of space travel.

In these regions of the north we support close partnership between the private and public sectors of the economy. Such cooperation is necessary to put the development of the north on a solid footing and to promote the social and economic well-being of those living in the north.

What is lacking perhaps, is an awareness by the potential investor of the opportunities that await the entrepreneur in the north and the willingness of the Canadian government to assume a reasonable part of the risk.

We fully recognize the role of private investment as being vital to resource development, especially in the north. We realize too if private capital is to participate in northern development, it must be adequately rewarded. Resource developments are often high-risk investments; they are often based on diminishing assets. The rewards to capital must take these into account.

Perhaps our biggest obstacle in developing the wealth in our Northland is one of communication. Adventurous men and women who have worked and studied in the north all return with unbridled enthusiasm for what can be done there.

If we can communicate the knowledge and optimism of these northern pioneers to the potential investor, there is no limit to the development possibilities in the Northwest Territories.

Jean Chrétien

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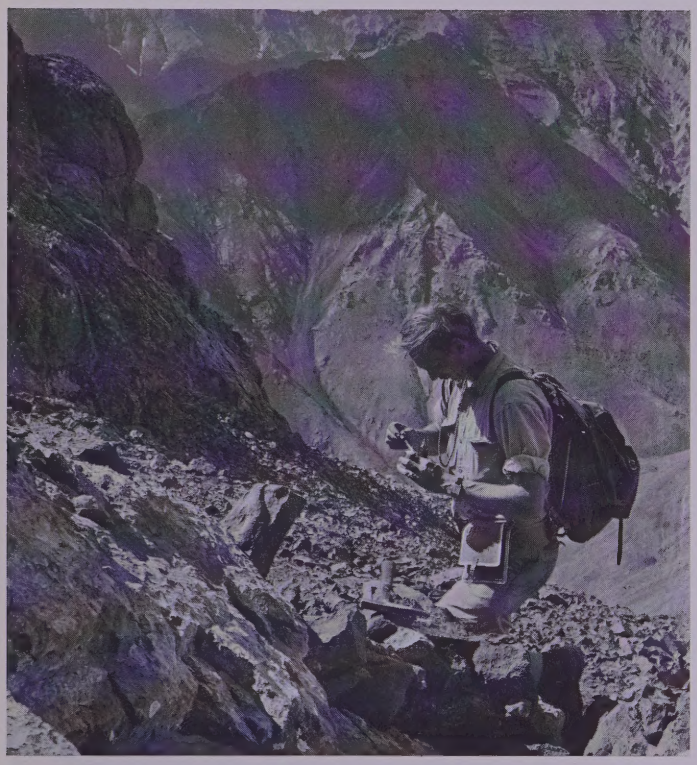
2 Pine Point lead-zinc mine

a land of challenge...

3 In the Richardson Mountains



The Northwest Territories. In fancy, an impossible land of ice and killing cold, of polar bears and Eskimos. A frozen wasteland.

In fact, Canada's greatest treasure house, a land of fabulous untapped wealth, of tremendous potential. A land of challenge.

It is undeniably a harsh land of empty expanses and of conditions that are a constant challenge to man. But it is no longer the alien land. Its challenges are being met and turned aside by man and machine.

The whine of giant freight aircraft engines and the staccato of helicopter rotors are the new, vibrant sounds of the North.

The growling bulldozer carving airstrips and roads through tundra and forest, the towering drilling rigs marching north to the Arctic Ocean are opening new vistas on the Canadian landscape.

Northern Canada is no longer just "the North". It is Yellowknife, the new capital of the Northwest Territories. It is Pine Point, centre of one of the world's largest base metal operations. It is Mary River, site of one of the world's largest iron ore bodies.

It is Coppermine, scene of one of Canada's biggest claim-staking and mine development operations.

It is all of these — and more.

4 Discovery Mine, Yellowknife

...of resources

The lid of Canada's great treasure chest is slowly being pried open, and the wealth that is being revealed is staggering.

Mountains of iron ore, rich new veins of silver, lead and zinc, and tungsten are being uncovered. Copper seekers are swarming over the barren plains and hills of the Coppermine River. Oil and gas explorers are surging up the Mackenzie valley and over the frozen seas to the Arctic Islands. Every facility is being strained as man and machine move north.

The potential of the Northwest Territories is barely known but it is now obvious that it is rich beyond belief. Look at the dramatic increase in mineral production.

In 1967, the Territories provided 2.6 per cent of Canada's total mineral production. Not much, but in 1962 it was only six-tenths of one per cent!

In 1962 the total production was valued at $14,726,747. By 1967 it had leaped to $114,261,438.

Mineral Production in Canada	**1953**	**1965**	**1967** (est)
Value in millions of dollars			
Gold	$139	$136	$111
Major base metals (copper, nickel, lead, zinc)	457	1,150	1,434
Iron Ore	44	431	455

Metal Prices		**1953**	**1965**	**1967**
Copper	lb.	29.80¢	35-39.50¢	54-58¢
Gold	oz.	$34.42	$35.00*	$35.00*
Lead	lb.	12.93¢	15.8-16¢	13.8-14¢
Nickel	lb.	55.75¢	74-77¢	94¢
Silver	oz.	84.01¢	$ 1.29	$ 1.99
Uranium	lb.	$10.00	$4.90-$15.00	$7.00-$8.00
Zinc	lb.	11.96¢	14.50¢	13.5-14¢
Iron Ore, grading 51.5% natural iron	ton	$ 7.60	$10.70-$13.25	$10.70-$13.25

*Plus premium

The Pine Point base metal operations on the shore of Great Slave Lake, for example, accounted for almost 42 per cent of Canada's lead and more than 18 per cent of zinc production in 1967. Mines in the Yellowknife region produced more than 12 per cent of the nation's gold.

The mining industry is still in its infancy.

Gilbert LaBine's discovery of North America's first radium deposit on the shore of Great Bear Lake in 1930 started the first mining rush across the 60th parallel.

For the next 30 years the Great Slave Lake gold mining industry dominated the Territories' economy. Then came Pine Point.

What will be next? There are known large iron ore deposits in the Belcher Islands of Hudson Bay and the Snake River area on the Yukon border. But they pale in the light of the Baffin Island deposits.

Base metals have been found in many areas far above the Arctic Circle. So have gold, silver and uranium.

Gas and oil seekers are convinced the Arctic Islands hold the world's biggest oil and gas reserves, and they are moving north in ever-increasing numbers to join in the hunt.

The Northwest Territories hold other resource riches.

There are an estimated 4,000,000 acres of arable land in the Territories, most of it now covered by forests. With the short growing season, forest growth is slow, but the rising local demand for forest products increases the potential for a major forest industry.

Already commercial farms are in operation in the western regions, providing grain, vegetables and livestock for meat and dairy products. The summer growing season is short, but because of the long periods of sunlight spectacular results are achieved.

The fur industry, which originally was the mainstay of the northern economy, is declining in importance. But fishing is a growing industry. Arctic char and beluga whale from the eastern regions are now gourmet dishes in world metropolises. At Hay River fishermen are netting $1,000,000 in whitefish from Great Slave Lake each year.

All this, from only a fraction of the 1,253,000 square miles that are the Northwest Territories. All this, in a land inhabited by only 30,000 people.

It is now Canada's challenge to harness more people and more money to develop the resources of the Northwest Territories.

6 Shopping at Tuktoyaktuk

...of opportunity

For nearly four centuries Canada's north has bedazzled and bedevilled the explorer and the adventurer.

In 1576, Sir Martin Frobisher was certain he had found his bonanza on Baffin Island. The gold he took back to England turned out to be iron pyrites — fool's gold.

In 1770, Samuel Hearne set out across the barrens to find the Northwest Passage to the Orient and the legendary Indian copper mines. He found neither.

However, young Hearne did unlock the door to Canada's great treasure vaults, and in the succeeding centuries other explorers, adventurers and fortune hunters have followed. Some have reached their goal, many others have not.

Today, a new breed of explorer is in the North. Armed with the latest technology and sciences, these men are telescoping time and events. Two hundred years ago, it took Hearne months to travel from Hudson Bay to the Coppermine River. He and his companions faced hunger, bitter weather and the threat of disease and illness.

Now the same journey is done between breakfast and dinner.

The prospector who once slogged his way by foot over treacherous rock and through muck, fighting black flies and mosquitoes all the way, now does his searching encased in a helicopter's plastic bubble.

It was Hearne's reports of the abundance of wildlife in the region that initiated resource development in the Northwest Territories. Wherever the fur traders went in those days the potential wealth of the north hove into view. In 1789, Alexander Mackenzie travelling the river that was to bear his name, found oil seeping out of the river banks in the vicinity of Fort Norman.

In 1820, the Arctic explorer Sir John Franklin travelled across the barrens and discovered the riches of Great Slave Lake.

As Canada moved into the 20th century, the North remained primarily a preserve for the native Eskimos and Indians while the white adventurers still sought the elusive Northwest Passage. The exploits of Roald Amundsen, who, after three years, inched his ship, the Gjoa through the ice to finally navigate the Northwest Passage, and Vilhjalmur Stefansson, who learned from the Eskimos how to survive in the Arctic, encouraged others to test their skills and strengths in the North.

At this point the Federal Government decided to undertake an inventory of its treasure house. Geologist Dr. Charles Camsell was appointed to organize a program of geological and geographical exploration.

In 1914, he located high grade gold ore in Yellowknife Bay.

In 1920, Imperial Oil Company began a detailed investigation of the Fort Norman oil seeps. A drilling program was started and, at a depth of 783 feet, oil was found.

Imperial Oil had an oil field, but how to service it? The airplane was just coming into its own, so the company decided to buy a pair of German Junkers aircraft. They were flown west by Wop May and George Gorman, who were to be among the first of a new breed of man — the bush pilot.

The 1930s were exciting years in the north, as the bush pilots and the prospectors swarmed over the Great Slave Lake area. Pilots like Punch Dickins, who made the first flight across the barren lands, became heroes to Canadian youth.

W. M. Archibald organized a flying service for Consolidated Mining and Smelting Company Limited to conduct an aerial exploration of the Territories. COMINCO carried out the first systematic study of the Coppermine river area, and a number of copper claims were staked.

The copper seekers were followed by the gold seekers from the northern Saskatchewan. Bush pilot G. H. "Mike" Finland flew the first staking crew into Yellowknife Bay in 1935 and Yellowknife became the "town of the air age."

Yesterday, it was the Gilbert LaBines, the Bernhard Days, the Wop Mays and the Punch Dickins. Today, it is the Murray Watts and the Ron Sheardowns.

Murray Watts is in the legendary tradition of the Canadian north. As a fresh, young prospector, in 1931 he paddled by canoe 1,200 miles up the east coast of Hudson Bay from Moose Factory to Cape Smith, in Ungava. For 18 months he and veteran prospector Michael McCart braved the violent wilderness of the Ungava peninsula looking for minerals.

Watts returned to Ungava 23 years later, this time by airplane, to uncover valuable asbestos deposits.

In 1961, Watts, flying in an aircraft piloted by Ron Sheardown, made an aerial survey of Baffin Island. Excited by what he and Sheardown saw, Watts returned the following year to examine on the ground a particularly interesting area on the northern half of the island. The fabulous iron ores of Mary River were uncovered.

Now, Murray Watts, restless traveller and explorer that

8 Copper prospector Jack Mustard

he is, has turned to a new project. He is in the Coppermine area, looking for the same copper that eluded Samuel Hearne 200 years ago.

Murray Watts has a vision of Coppermine, and of the Canadian North. He wants his fellow Canadians to share it with him.

"We have to have the pioneering spirit in the North," he says. "We have to have people who can say, 'this is my home.' "

Capital and human investment, encouraged by an enthusiastic government, are the keys to realizing that vision.

Financial and human capital have moved comparatively slowly across the 60th parallel into the Northwest Territories. Many years have elapsed between a Giant Yellowknife and a Coppermine, a Norman Wells and a Pine Point, a Samuel Hearne and a Murray Watts.

However, as man's knowledge of the North increases, as his adaptability to new environments improves, as old areas of investment diminish, the Northwest Territories are proving more attractive to investors.

The canoe of the old voyageur and the Eskimo dogsleds are still in use in the Territories, but they are becoming more of a novelty, and only a supplementary form of transportation. The heavy and light aircraft and the versatile helicopter are opening up whole new areas.

Daily schedule air service is now commonplace. On the horizon are hovercraft that will skim over the Arctic tundra and ice.

The legendary bush pilots, who flew by the seat of their pants in the early days, are fast disappearing. The instinct which enabled these men to fly across hundreds of miles of poorly mapped land in all types of weather and somehow reach their destination still is a vital element in northern flying. And the ability to make emergency repairs with any materials that happen to be handy is not being lost.

But today's pilots have larger, more dependable planes and electronic navigational aids. Ground facilities also have improved, with construction of all-weather runways and service depots. Development of the turbine engine has been a big help to winter flying, all but eliminating the lengthy start-up procedure for piston engines in sub-zero temperatures.

Poor visibility in blowing snow or summer fog and occasional high winds are still a problem.

But the men who encounter these conditions say they are not as bad or as frequent as some stories indicate.

"A lot of the problems are exaggerated," says pilot-explorer Ron Sheardown. "You get a lot of clear weather up north — ideal for flying. And you don't have to look far to find a place to land."

But there are some jobs just too big for aircraft. For high bulk cargoes — moving ore to market in particular — the aircraft must give way to slower but cheaper railway and shipping routes.

Railways, however, require a tremendous capital investment in construction and there must be a guarantee that the investment will yield dividends. It took the Pine Point base metal operations to bring the railway into the Territories and it will take projects of a similar size to extend rail services.

The Great Slave Lake Railway Co. charges roughly $1.70 per ton mile to move lead and zinc concentrates and $2.46 for lead and zinc metals over its Pine Point line. Prices are subject to negotiation.

In the eastern Arctic, ships from the Atlantic can reach

9 Winter airlift, Coppermine

northern Baffin Island for about eight or ten weeks each summer. Cargo rates from Montreal to Baffin Island average around $90 per ton. In the west, although the route around Alaska is longer and more difficult, the route to the Pacific is now open an average of six weeks a year. Ice conditions vary from year to year, but icebreakers and ships with strengthened hulls will increase the length of these seasons considerably.

Government and business are now looking at the concept of giant transport submarines or submarine tugs pulling underwater barges beneath the ice. Scientists are now working on ways to keep northern harbours ice free, by such methods as bubbling warm air from the bottom.

The Mackenzie river continues to be a main transportation artery through the Territories. During the summer months the Crown-owned Northern Transportation Company Ltd. provides a 4,000 mile shipping network, using tugs and barges on the Mackenzie, Slave and Athabasca Rivers. Two coastal vessels operate from the Mackenzie Delta east to the Boothia Peninsula and west to Colville River, Alaska, on the Arctic Ocean. The southern terminals of the system are at the railheads of Hay River and Waterways, Alta.

Northern Transportation's general merchandise rate along the system is $2 per hundredweight from Hay River to Inuvik and $5.40 per hundredweight from Hay River to Coppermine. Trucking rates from Edmonton to Hay River average $2.25 per hundredweight.

Air freight from Edmonton to Inuvik is moved at rates near 25 cents per pound, and from Inuvik to Sachs Harbour, on Banks Island, at approximately 30 cents.

Fuel costs in the Territories vary with location, but those in the more northerly points are generally higher. Imperial Oil's refinery at Norman Wells supplies the Mackenzie district, almost entirely by barge on the Mackenzie River and by coastal freighter along the Arctic coast during the summer months. The southern Great Slave Lake area is mainly supplied from the Edmonton area by rail and truck.

Ironically, in the northern Arctic islands, site of what may be the world's biggest reserve of oil, petroleum products imported by sea from Venezuela are currently used.

The industrial consumer in Frobisher Bay, on Baffin Island, pays in the neighborhood of 47 cents a gallon for gasoline, and 25 cents for fuel oil. At Yellowknife, the price averages 50 cents for gasoline and 30 cents for fuel oil shipped in by barge and truck.

At present there are no natural gas pipelines serving the Territories, but, according to the Federal Government, one recent study showed that the wellhead price for natural gas at wells being discovered in the southern regions would be around 12-16 cents per 1,000 cubic feet.

Exploration and development in the Northwest Territories is expensive. The risks are high — but the rewards can be fantastic.

The Federal Government, as the custodian of the Territories, acknowledges that private investment alone cannot carry out the development of this vast area. It therefore has established a number of northern development programs to give financial assistance to private firms wishing to stake their claim in the Territories.

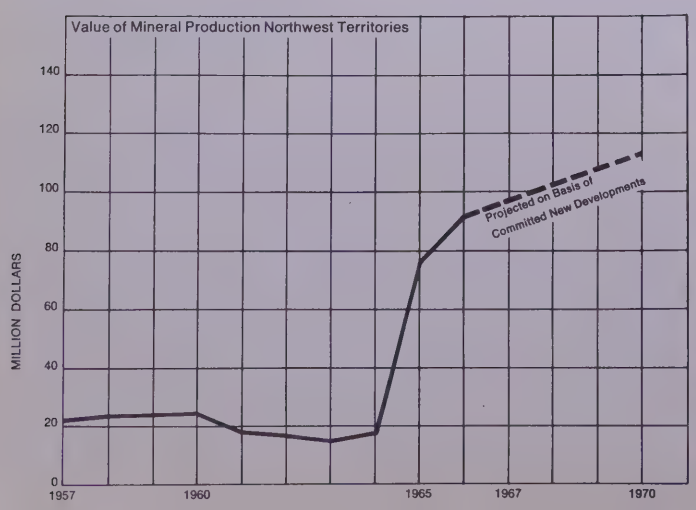
A northern mineral exploration program provides federal contributions for up to 40 per cent of the cost of approved exploration programs in search of oil or minerals in the Northwest Territories and Yukon Territory.

If the exploration program is successful, the federal contribution becomes a loan, repayable over 10 years starting one year after the start of production. If the program is not successful, the grant is regarded as a contribution to the northern exploration effort and will not be repayable.

The grants are available to Canadian citizens over 21 who own claims, leases or exploration permits, and to Canadian companies which are at least 50 per cent owned by Canadians.

The government's cost-sharing incentive programs also cover transportation requirements, with assistance for construction of airstrips and roads on a temporary or permanent basis.

For Exploratory Airports built to assist initial exploration work or to assist in locating mineral or other natural resources, the government pays half of the construction



10 Winter staging base, Port Radium

11 Reindeer steaks on the hoof, Tuktoyaktuk

costs up to $20,000. The company involved must pay all costs in excess of $40,000.

For Pre-production Airports, to assist the pre-production or early production phases of resource development, the government pays half the cost, up to a maximum $100,000.

Natural resource development companies, private tourist or recreational enterprises and established air carriers are eligible to participate in the airport programs.

Under its roads program the federal government pays up to $20,000 on a 50-50 basis for temporary roads to a resource project in the exploration or early development stage. The government also pays up to 50% of the cost of initial access roads, or 5% of the company's maximum yearly expenditure on exploration or development of the project.

Maximum yearly contribution for each road is $10,000 for exploration projects and $50,000 for development projects.

The government will pay as much as two-thirds of construction costs of permanent access roads providing this does not exceed 15% of the actual capital investment by the company before the start of commercial production or exploitation. Or, it can pay a flat rate of $40,000 a mile.

Sawmills, tourist lodges, canneries or any industries which will add to the growth and development of the Territories may be eligible for this assistance.

Prospectors agreeing to work for a minimum of 60 days prospecting, may receive grants up to $900. a year for supplies and travel expenses.

...of extremes

12 Garden fresh at Aklavik

The Northwest Territories can be as miserable and unfriendly a place as any man wishes to make it. But the fact is that the north, for the most part, is no less friendly and comfortable than most other areas of Canada.

For instance, the lowest temperature ever recorded at Port Radium, on Great Bear Lake, is -54 degrees, three degrees warmer than the record low of -57 degrees for Edmonton, two degrees warmer than Regina's record of -56 degrees, and the same as Winnipeg's coldest day.

The record low at Coppermine, on the Arctic Ocean is -58, and at Frobisher Bay, on Baffin Island, only -49 degrees.

In the summer months, the North sometimes swelters. Fort Smith, on the Alberta-NWT border, has recorded a record high of 103 degrees.

The average July temperature at Fort Simpson, in the upper Mackenzie valley is 62 degrees. In the Arctic Islands, the temperature in the summer months often climbs into the 70s.

This is not to say the northern climate is not rigorous; it is, but because of the extended length of the winters, not the extreme cold.

The Northwest Territories are divided into two climatological regions — the Arctic and sub-Arctic. The natural border separating these regions is the treeline, which starts close to the Manitoba border at Hudson Bay and

13 In the High Arctic

curves northwest to the Arctic Ocean at the Mackenzie river delta.

North of the treeline the summers are too short and cool to permit tree growth. South of the line, even though the areas may be underlain by permafrost, trees are able to grow — although their development is much slower than in southern regions.

North of the treeline is the tundra, a desert-like plain. Below is a land of lakes, rivers, and forests similar to Northern Ontario.

Legend has the Territories enveloped in deep snows most of the year. In fact, the annual snowfall is about half that of such cities as Winnipeg and Montreal.

Storms remain a major hazard. Blowing snow can be a problem even on a cloudless day and there are the occasional "whiteouts" on overcast days when the ground, air and horizon blend into an indistinguishable white mass.

Along the coastline fog can be a problem in the summer months. But generally, northern skies are clear, offering excellent flying conditions. Continual improvements in weather forecasting and aircraft instrumentation are overcoming the hazards that have plagued earlier travellers.

14 Ice breaking in the Archipelago

a land of regions

15 Preparing the pit, Pine Point

The Northwest Territories are immense. The land area covers 1,253,000 square miles, more than one-third the size of the whole of Canada, and greater than the Atlantic Provinces, Quebec, Ontario and Manitoba combined.

Huge in size, the Territories are, naturally, diverse in character. The towering mountain ranges, lush forests and great rivers of the south and west give way to the bleak tundra of the central plains, then to the rugged terrain of the eastern Arctic and the glacial fields and desolate islands of the Arctic Islands.

Because of their diversity, the seven major regions have special characteristics and particular resource potential. Each has its own special challenge to the private investor and to the Governments of Canada and the Northwest Territories who have a responsibility in stimulating interest in this land of the waiting wealth.

Transportation to the Waiting Wealth
ARCTIC OCEAN
ALASKA
Tuktoyaktuk
Sachs Harbor
Inuvik
Paulatuk
YUKON TERRITORY
MACKENZIE
Coppermine
COPPERMINE
Bathurst Inlet
Port Radium
Whitehorse
YELLOWKNIF
Fort Simpson
Yellowknife
Reliance
BRITISH COLUMBIA
Hay River
Fitzgerald
ALBERTA
SASKATCHE
to Vancouver
to Edmonton
Waterways

Coastal Routes
River and Lake Routes
Roads
Railroads
Airlines
GREENLAND
Alexandra Fiord
Thule
ARCTIC ISLANDS
Resolute
BAFFIN BAY
Arctic Bay
Milne Inlet
BAFFIN ISLANDS
Cambridge Bay
Spence Bay
Igloolik
Arctic Circle
Repulse Bay
Frobisher Bay
KEEWATIN
Baker Lake
Chesterfield Inlet
HUDSON BAY
to Montreal
Fort Chimo
Churchill
MANITOBA
QUEBEC

lower great slave

The thrust into the Northwest Territories begins in the Lower Great Slave region. Here are assembled the people, the transportation, the services and the industries — all the main tools for development.

Straddling the upper reaches of the 1,700-mile waterway of the Mackenzie, Slave, Athabasca and Peace rivers, the Lower Great Slave became the gateway to the Mackenzie district when canoes, river barges and bush planes provided the main transportation.

Today, with freight and people moving over new highways and railways, linking the Territories to the rest of Canada, the Lower Great Slave region has assumed an even greater role as a northern service centre.

Hay River, with a population of 2,700, is the northern terminus of the Great Slave Railway and the supply depot for much of the mining and oil exploration activity in the Northwest Territories.

Fort Smith, with a population of 2,500, has grown from a small portage settlement on the only non-navigable stretch of the Mackenzie-Slave river system to an important transportation and distribution centre.

But the focus today is on Pine Point, whose rich lead-zinc deposits have created a huge mining complex and spurred mineral exploration throughout the Territories.

Although the presence of the base metals ore body on the south shore of Great Slave Lake was known for years, it took a combination of massive investments of both private and public capital and a railway to bring Pine Point into production.

Today, the mine is producing more than $42,000,000 worth of lead and zinc a year. In 1967, 1,521,000 tons of lead-zinc ore was mined and shipped in concentrated form to smelters in British Columbia, and an additional 330,000 tons of highgrade ore was shipped directly to smelters.

Ore reserves at the end of the year rose to 40,500,000 tons, containing about 3,800,000 tons of lead and zinc.

In 1967, Pine Point realized a net profit of $34,200,000 on its operations.

Today, Pine Point is a lively community of nearly 1,000 persons enjoying all the comforts and benefits available in southern Canada.

The success of the Pine Point operation has sent mineral seekers on new expeditions throughout the Lower Great Slave. Promising areas of gold and uranium between Lake Athabasca and Great Slave Lake have been staked.

About half the estimated 4,000,000 acres of arable land

18 Northern railhead, Hay River

in the Northwest Territories is in the Slave River valley, between Fort Smith and Great Slave Lake. Of this, about 400,000 acres is regarded as potential farm land.

As the demand for fresh water in the south grows, the water resources of the Territories increase in importance. The Taltson and Dubawnt rivers flowing through the region hold great potential for hydro-electric development. The Taltson has already been harnessed at Twin Gorges, where a Northern Canada Power Commission station provides 10,000 kilowatts for the area.

yellowknife

There have been times, in its young past, when its residents doubted the future of Yellowknife. In 1967, when the Federal Government declared Yellowknife the new capital of the Territories, Yellowknife's future was assured.

The old settlement blossomed as a boom town in 1934 after two prospectors, C. J. Baker and H. Muir, trapped by a storm in a cove on Yellowknife Bay, decided to do a little prospecting near the camp. They discovered a quartz vein running down a low hill into the muskeg. The vein was liberally specked with gold. The rush to Yellowknife was on!

The next few years were exciting times as miners, bush pilots and fortune seekers swarmed into Yellowknife Bay.

Until the 1960s Yellowknife had to depend on the Slave River and Great Slave Lake water route for most of its supplies and aircraft to transport people to and from the outside world.

However, construction of the Mackenzie highway from Hay River, around the western end of Great Slave Lake in 1961 has provided fast, low-cost transportation to the rest of Canada. The arrival of the Pine Point railway, on the south shore of the lake has also lowered transportation costs.

For its size, Yellowknife is better served than most towns in southern Canada. It has daily air service, and a variety of firms provide air, ground and water transport. New motels and hotels are being built to accommodate the growing influx of tourists.

The town of 5,000 persons has the full range of services — supermarkets, banks, taxis, medical and dental services, law offices, garages, theatre, department stores, excellent schools and churches. There is curling and skating in the winter, and golfing in summer. Swimming, boating and some of the finest fishing anywhere are right on Yellowknife's doorstep.

CFYK, the CBC radio station, is the base station of the corporation's Mackenzie district network. A low-power television station now provides taped programs to the Yellowknife region.

Three hydro-electric stations, with a capacity of more than 17,000 kilowatts, have been established on the Snare and Yellowknife rivers, to supply the Yellowknife region with a steady supply of power.

Electric power rates in the Territories depend on a number of factors, including location, quantity of power required, transmission distance and use. Increased power production facilities are bringing power costs down. At Yellowknife, for example, the cost of industrial power dropped from $1.50 per kwh in 1960 to 85 cents in 1968.

19 Golf north of 60, Yellowknife

The gold mining industry, which created Yellowknife, has been in the doldrums. Several mines were started up in the first rush, but only two operations remain.

The largest, Giant Yellowknife, was started in 1946 and has continued to be the stabilizing influence on the community. Its sister mine, Con-Rycon, has been in production since 1939. Fifty miles to the northeast, Discovery Mines is still producing.

Eldorado, the first producing mine in the Northwest Territories, was closed, but the community of Port Radium, on Great Bear Lake, is still an active town, supporting the Echo Bay mine which in 1967 produced more than 3,500,000 ounces of silver.

Despite the uncertainty of the gold-mining industry the search for the precious mineral goes on. Potential gold properties in the Yellowknife area, and at Snare River and Clan Lake to the north, are currently under active study. Uranium properties in the Marian River, Marian Lake and Hottah Lake districts between Great Bear and Great Slave Lakes, are also under intensive examination.

The success of the Pine Point base metals operation has pointed up the potential of recent base metal finds at Indian Mountain, northeast of Yellowknife, and at Homer Lake, just north of the capital.

20 A suburb on Yellowknife Bay

High fashion, Arctic style, Inuvik

The Mackenzie river is the Northwest Territories' golden cord.

Strung along its 1,700-mile system is the real wealth of the north — untold riches in minerals, vast reserves of forests and agricultural land, furs, fisheries, transportation systems, tourist attractions, people, and the water or the mighty river itself.

It was the wealth of furs that first brought the white man to the Mackenzie. Furs, and the unfulfilled belief that the river would lead to the Northwest Passage.

But the earliest explorers discovered other signs of great potential wealth. Alexander Mackenzie found oil near Fort Norman. But it was not until 1932 that the Imperial Oil refinery began producing for the local mining industry.

A prefabricated refinery capable of producing 840 barrels of oil products a day was shipped to Fort Norman in 1939. During the height of the Second World War a pipeline was constructed to Whitehorse, and the refinery's capacity was boosted to 1,000 barrels a day.

Subsequent expansion programs have increased the refinery capacity to 1,900 barrels a day. In 1967 the refinery produced nearly 700,000 barrels of gasoline, stove oil, diesel and industrial fuels for the Yukon and Mackenzie region.

As exploration fever spreads across the Territories, the search for oil and gas along the Mackenzie has accelerated at a tremendous rate. Geologists are now convinced that the region is an extension of the giant Alberta oil fields, an extension which may run to the continental shelf under the Arctic Ocean and western islands of the Arctic archipelago.

In 1966, an important gas discovery was made at Pointed Mountain, 15 miles northwest of Fort Liard, on the NWT-British Columbia border. Exploration teams are now fanning out between Fort Simpson and Great Slave Lake, looking for a possible extension of the Rainbow-Zama Lake area in northern Alberta.

A wealth of minerals is rapidly being uncovered along the Mackenzie Valley. A huge tungsten mine is in operation near the Yukon border, 135 miles north of Watson Lake. Lead, zinc and silver have been found in the Prairie Creek area and a giant iron ore deposit has been located on the Yukon border in the Snake River area.

Fort Simpson, at the junction of the Mackenzie and Liard Rivers, is the largest community in the upper reaches of the valley.

Founded in 1804 as a trading post, Fort Simpson is now a busy community of 1,000 and site of a unique exper-

21 Mackenzie river majesty, Arctic Red River

imental farm operated by the Federal Department of Agriculture. Since 1947 the farm has done much to dispel the many misconceptions about the agricultural potential of the Mackenzie region.

The average frost-free season at Fort Simpson is only 92 days, but wheat, oats, barley and hay are produced, along with potatoes, turnips, carrots, lettuce, radishes, peas, beans, strawberries, raspberries, and even the tender tomato.

Many small garden plots, along the valley, as far north

as the delta itself, supply fresh vegetables and fruit to residents.

The vast timber stands along the river valley and throughout the delta are seen as a base for a potential local logging industry. Some saw mills already operate in the delta forests.

The Mackenzie system holds tremendous hydro-electric potential, with the South Nahanni river ready to yield an estimated 375,000 kilowatts. More than 1,000,000 kilowatts of power potential is available in the Porcupine-Rat-Peel tributaries straddling the Yukon border.

The Mackenzie river is still known as the "highway to the north" but an ever-expanding system of roads is bringing land transport into the valley.

The Mackenzie highway is currently being extended from Hay River, on Great Slave Lake, southeast to Fort Smith. Also proposed is a highway linking the Fort Norman oil fields to Ross River and Alaska highway.

In the Mackenzie delta Aklavik was originally the main settlement where the muskrat trappers of the delta sold their furs and purchased their supplies. But over the years the town gradually succumbed to the ravages of river erosion and melting permafrost. A search for a new site was begun and in 1954 the town of Inuvik, 30 miles to the east, was born.

The new town, which now has a population of more than 2,000, literally came off the drawing board as planners and engineers devised new techniques to meet the challenges

of northern construction. All major buildings are constructed on piles driven into the permafrost. Heat, water and sewage are carried on the surface through enclosed pipes called utilidors.

The town, some 120 miles inside the Arctic Circle, has modern schools and hostels, a hospital, stores, hotel, theatre, and other normal community services, and regular air connections to southern Canada.

But old Aklavik refuses to die; more than 600 persons, mostly Indians and oldtimers, remain in the community.

Fort McPherson, one of the early trading posts along the Mackenzie, now has a population of 750. Tuktoyaktuk, on the Arctic coast, has about 500 residents.

Near Tuktoyaktuk is a unique experimental reindeer station operated under the Federal Government in an attempt to provide the region with a steady supply of fresh meat. The herd, now numbering about 10,000, was expected to provide about 300,000 pounds of meat in 1968, and by 1977, when the herd reaches 30,000, it should provide more than 1,000,000 pounds of meat annually.

The traditional ways of life are disappearing in the Mackenzie, and throughout the entire Territories, as new skills are introduced. Today, more than 5,000 children are enrolled in classrooms throughout the North, receiving a formal education which was not available to the older generation.

The Federal Government has established a vocational training school at Yellowknife to help the older generation seize the opportunities opening up in the North. Schools and hostels are scattered along the Mackenzie river to provide the native children with an education. Their parents attend adult education classes to learn new ways to live in the north.

The greatest challenge facing public and private investors is the harnessing of this human resource to the natural resources of the Territories.

23 Mineral hunt on the Belcher Islands

Keewatin is an Indian word meaning north wind. The wind does blow almost constantly across the Keewatin tundra, that treeless expanse stretching far inland from the bleak coast of Hudson Bay.

This is the Arctic of the history books, where many an explorer faced hunger, starvation and death. This is the land where today only the hardy can survive, where only the most determined, the most adventuresome would want to live.

Yet the Keewatin district is potentially one of the richest mineral areas in the Northwest Territories. This massive extension of the Precambrian Shield contains the same rock and minerals that have produced the great mining complexes in Quebec, Ontario and Manitoba.

But the Keewatin treasure chest remains virtually locked. Only one mine has flourished, a nickel-copper producer at Rankin Inlet, on the Hudson Bay Coast. A showcase mine, using specially-trained native workers, it was producing as high as $3,000,000 worth of metals annually before exhausting its ore body in 1962 after six years' operation.

Today, resource exploration activity in the Keewatin is focussed on oil, offshore under Hudson Bay. Ten companies, representing major oil interests in Canada, the United States and Europe, are involved in seismic surveys of the giant sedimentary basin. The Federal Government has issued five exploration permits covering a total of 54,000,000 acres of the ocean floor.

Off the east coast of Hudson Bay are the massive iron ore deposits of the Belcher Islands.

24 Autumn at Pond Inlet

Exploration companies are now moving inland and evidence of copper and gold deposits in the south-central region of Keewatin have been uncovered.

The historic port of Churchill, in northeastern Manitoba, serves as the main distribution and transportation centre for Keewatin. Its fully developed seaport is used by European shippers to bring manufactured goods for distribution on the Canadian prairies. The vessels return with western grain which is transported to the port over the Hudson Bay Railway.

Churchill is also the jumping off spot for scheduled and charter aircraft flying to and from the central Arctic. Formerly a large military base, Fort Churchill is now the site of a major aero-space centre and a rocket research range operated by the National Research Council.

Beyond Churchill there are no major settlements in the Keewatin district. The Federal Government has constructed schools and health centres along the Hudson Bay coast at such historic native trading posts as Whale Cove, Rankin Inlet, Chesterfield Inlet, Coral Harbour, Baker Lake and Eskimo Point.

The people of the Keewatin remain romantic figures of

25 Rocket launching at Fort Churchill

the north, hunting the white whale and seal in the cold waters of Hudson Bay, the caribou and the polar bear on the barrens. But gradually, as they learn new skills and find new opportunities in the settlements, the Eskimos are giving up their nomadic lives. With government assistance they are moving into permanent frame homes. They no longer rely entirely on their hunting luck for food and skins for clothing.

Nevertheless their native intelligence on Arctic survival in this bleakest area of the Canadian North makes the Keewatin people one of the most potentially valuable resources of the region.

Baffin Island has intrigued the adventurer and the explorer for centuries. Its majestic mountains, deep fiords and windswept plains were first discovered by Norse adventurers from Iceland and Greenland almost 1,000 years ago.

In 1576 Martin Frobisher sailed up the bay on the island's east coast which now bears his name.

Other explorers discovered the wealth of the Arctic seas. Davis Strait, between Baffin Island and Greenland, became a popular whaling ground in the 18th and 19th centuries until the herds declined from overhunting.

It was not until after the Second World War that men began to think about the mineral wealth of the region.

The advent of aerial mapping and scientific surveys by the federal government; development of airborne geological survey instruments such as the magnetometer and availability of long-range aircraft development during the war, made the discovery and eventual tapping of this wealth much easier.

A dramatic example of the region's possibilities was discovered during an aerial survey in 1961 when Murray Watts and his pilot, Ron Sheardown, discovered the fabled Mary River iron ore deposits.

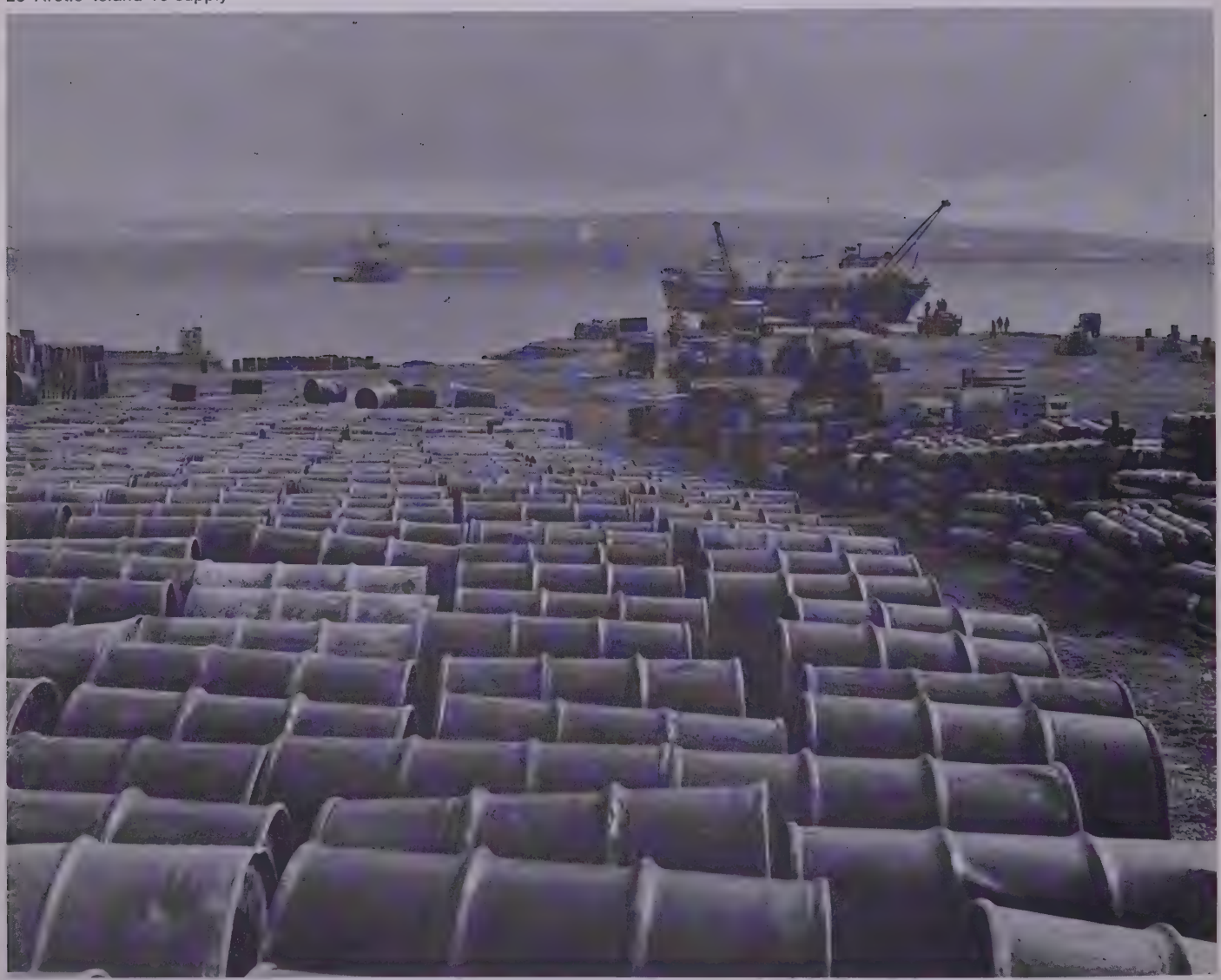
Exploratory drilling has established an ore body of at least 184,000,000 tons with an average grade of 69% total iron, high enough to feed directly into the furnaces of the world's steel centres.

Like most northern ventures, economical transportation of this ore to markets is a problem, but it can be solved. A 67-mile temporary road was constructed in 1965 to link the deposit to Milne Inlet, a deepwater harbor on the northern coast of Baffin Island, and there are proposals for a railway which eventually would carry the ore to large ships at Milne Inlet.

While the present shipping season averages only six weeks a year, it could be doubled by use of icebreakers. And with the rapid advancement of technology, the possibility of giant nuclear submarines taking ore to the world's blast furnaces the year round is now being seriously advanced.

Today's traveller to Baffin Island has a much easier time than early visitors like Frobisher, John Davis and Henry Hudson. The perilous journey by frail wooden boats has been replaced by comfortable scheduled airline flights from Montreal to Frobisher Bay. A fleet of summer supply ships makes regular calls with heavy cargoes.

26 Arctic Island re-supply



Radio, telephone and telegraph lines provide instant communication with other parts of Canada and the world.

Frobisher Bay has grown to a thriving community of about 1,600 persons. It has a low-power radio station of CBC's northern service, offering news and entertainment. The first radio dramas written in the Eskimo language have been written and broadcast at Frobisher Bay.

Pangnirtung has grown from a tiny Eskimo camp to a prosperous community of about 500 persons and the settlement of Cape Dorset is gaining a world-wide reputation in the world of art for its Eskimo soapstone carvings and stoneblock prints and engravings.

arctic islands

The islands of the High Arctic are Canada's last frontier. Locked in polar isolation, the archipelago remains man's greatest challenge in the north. The challenge is already being met and the potential rewards are staggering.

While some of the islands in the southern half of the archipelago were visited by the early explorers, the northern islands were relatively unknown up to the 1950s.

The decision to build an inter-continental defence system in the High Arctic in the 1950s marked the beginning of an exciting and daring mission to establish man's presence in the polar region. Construction of the string of Distant Early Warning radar stations throughout the archipelago proved that man has the technology to build and to live under such remote and harsh conditions.

The Federal Government's decision to undertake a detailed mapping and study of the polar continental shelf running along the western rim of the archipelago showed Canada's determination to plant her flag on all her territories, no matter how isolated.

In doing so, scientists have uncovered indications that the western islands may hold the world's largest pool of oil and gas. Discovery of large areas of thick sedimentary rock has already resulted in a massive oil exploration program.

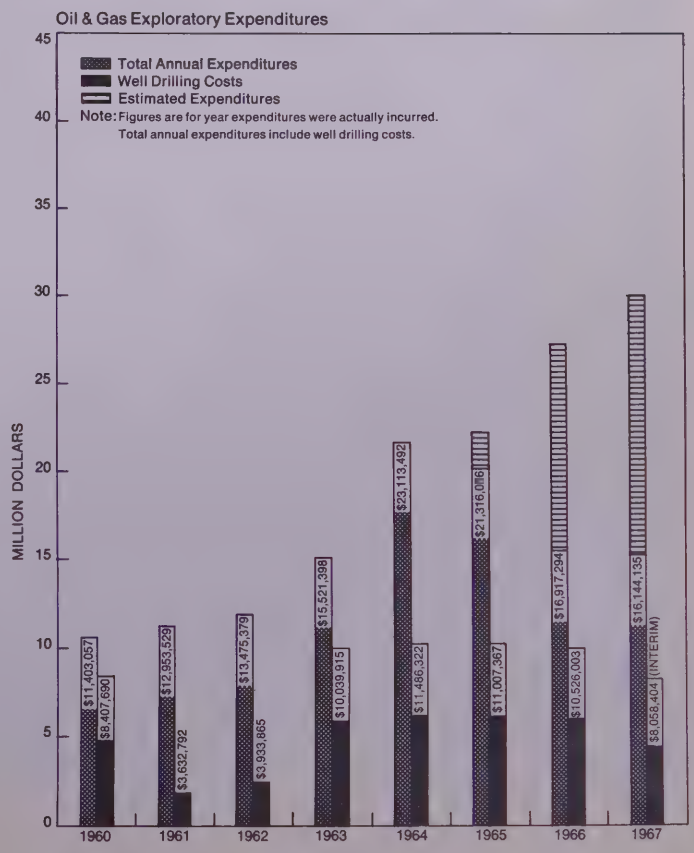
Exploration crews are conducting seismic surveys in the Melville Island area and plan to start drilling in 1969. A group of 20 mining and oil companies has joined forces with the Federal Government to form Panarctic Oils Ltd., to explore 50,000,000 acres now under a three-year lease. The exploration program is expected to cost about $20,000,000, with the Federal Government supplying $9,000,000 of the project's capital costs.

Modern technology also is playing an important role, not only with improved transportation, but improved tools designed to make development of the High Arctic economically feasible.

Oil is not the only lure of the islands. Deposits of base metals have been discovered and exploration is underway. Lead-zinc deposits have been discovered on Little Cornwallis Island, while the 15-member Muskox Syndicate is exploring a copper find in the Shaler mountains on the northern section of Victoria Island.

Arctic Island communities are small and scattered. Re-

27 Summer sailing, Devon Island



28 Weather station, Eureka

solute Bay, a harbour and air terminus linked to Montreal by weekly scheduled flights via Frobisher Bay, is the main supply centre, while Cambridge Bay is the centre of Dew Line operations.

Resolute Bay is also the site of the world's northernmost space research station. It is used as a rocket-launching site by crews from the National Research Council's Research Rocket Range at Churchill.

Much of the present activity in the islands is of a scientific nature rather than mineral exploration. This area is on the roof of the world and the site of many phenomena which man has yet to understand fully.

The islands are the current home of the roaming north magnetic pole which now is in the Bathurst Island region, and as such, provide a giant laboratory for the study of the magnetic and radiation fields around the planet.

While the climate of the Arctic islands is inhospitable it is bearable for man and beast. Muskox, snowshoe rabbits, foxes and polar bears roam the wilderness. Scattered throughout the islands are many military and weather stations, one as far north as Alert, only 500 miles from the North Pole, where men live in complete comfort in well-constructed buildings.

New architectural designs, ranging from high-rise buildings to plastic-covered, temperature-controlled communities are on the drawing boards for the Arctic islands. New lightweight clothing, new forms of transportation are constantly being developed and improved to make living more comfortable in this vast wilderness.

The challenge of the last frontier is being met.

And now Coppermine. One of the most exciting chapters on the development of the Northwest Territories is being written on the great brown plain that dips and rolls its way to the Arctic Ocean shore.

Here, man and machine are burrowing beneath the gravel and rock covering the frozen earth to tap a fabulous fortune in copper and other precious minerals.

Here are coming the men whose convictions on the potential of the Canadian north are so strong that they are risking millions to prove that they are right.

Here lies the waiting wealth.

The centre of all the activity today is Hope Lake, one of those millions of lakes that in the northern summer make the Northwest Territories resemble an oversoaked sponge.

Nestled between low rock-studded hills, 350 miles north of Yellowknife, Coppermine was until 1967 virtually unknown. But suddenly it was to become the destination of hundreds in one of the biggest staking rushes in Canadian mining history.

Hope Lake is strategically located in an area of intensive exploration, stretching west to east about 125 miles, and about 60 miles inland, around the historic Coppermine river.

Samuel Hearne paddled down the Coppermine river in 1771 in his futile search for the legendary Indian copper mines. He did find a four-pound piece of native copper, but otherwise he was not impressed.

For nearly two centuries the plain of volcanic rubble has intrigued explorers and mining men. Murray Watts was one of these men.

So was Prime Minister Pierre Elliott Trudeau. An enthusiast of the Canadian North, the prime minister, in 1965, just prior to his election to Parliament, was among a party of explorers who travelled down the Coppermine river to see at first hand the resource potential.

He returned again in 1968 on holiday to inspect and encourage the tremendous resource development projects under way throughout the Far North.

Watts first heard of the Coppermine potential back in the 1930s but it wasn't until 1964 that he made his first trip to the area. He liked what he saw and was convinced of the possibilities. He felt it worth the gamble to make a thorough study of the area.

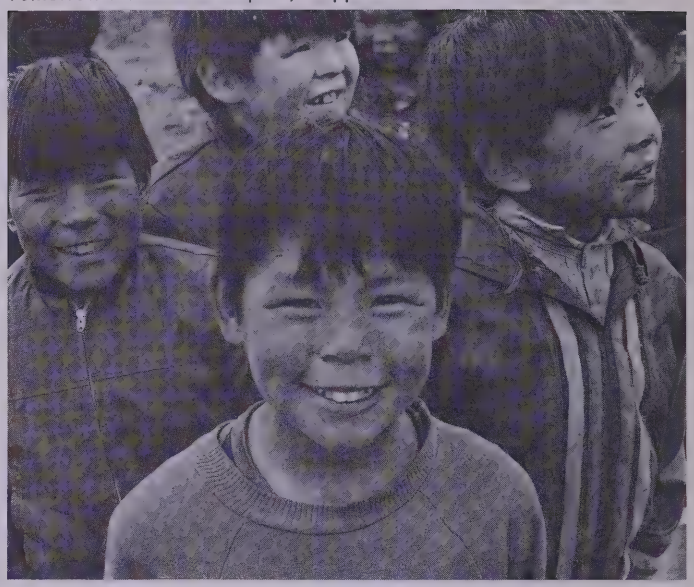
Watts made careful plans. He gathered together knowledgeable men to coordinate and develop his project.

Serious staking in the Coppermine area began in the

29 The waiting wealth, Coppermine

30 Murray Watts Sr. and Jr.

Tomorrow's NWT developers, Coppermine



summer of 1966, with the claims being taken by PCE Explorations Limited, a company of which Watts is president. in the spring of 1967 PCE Explorations joined with four corporate partners to form Coppermine River Limited to take over these first claims and conduct a major exploration program.

Equipment and material for a fully-serviced base camp was purchased and flown to the area. A Hercules aircraft delivered 400 tons, 22 tons at a time, landing on a specially prepared ice strip on a nearby lake.

In May, a maintenance building, cook house and an engineering building were erected at a cost of $30,000.

In July, a tractor took only ten days to prepare a permanent air strip on solid ground, at a cost of only $2,500. Then the machine went on to construct a 25-mile tote road at a rate of about one mile a day.

Meanwhile, other explorers appeared on the scene. One young Toronto prospector, Gordon Leliever, who shared Watts' enthusiasm for the potential of Coppermine, began staking claims in the fall of 1966.

Returning to Toronto, Leliever outlined the possibilities of a Coppermine development program to broker Fred Henderson, a man who shares with Watts and Leliever a belief in the tremendous future and potential of the Northwest Territories. Intrigued, Henderson flew to the area to see for himself. He, too, became convinced of the feasibility of an imaginative, daring scheme to unlock the Coppermine treasures. He relayed his enthusiasm to Jack Austin, a member of a Vancouver mining group.

Austin, executive assistant to the Hon. Arthur Laing, Minister of Northern Affairs and National Resources, from 1963 to 1965, knew Watts well and respected his professionalism. After a review of the results of initial exploration and on-site inspection, a new company, Hearne Coppermine Explorations Limited was created to add major impetus to the work already being done in the area. Hearne acquired more than 3,000 claims staked mainly by Leliever.

By midsummer 1967 the Coppermine rush was going full blast. At the end of 1967 more than 22,000 claims had been staked and by July, 1968, this total had climbed to 40,000. In April alone, a record 7,200 claims were recorded, surpassing the previous record of 6,800 claims in the lead-zinc ore rush at Pine Point, in December 1965.

In midsummer, 1968, two base camps were in operation on the shore of Hope Lake — one, for Watts' Coppermine River Limited, and the second, for Hearne Coppermine Exploration Limited.

The two organizations spared little in making their camps as comfortable and efficient as possible. Pre-cut frames for insulated buildings were flown in and assembled on the site. Electricity, running hot and cold water, showers, radio-telephone communication and a fleet of trucks and helicopters were some of the main elements of comfort and efficiency.

Supplies of fresh meat and vegetables, foam mattresses, stocks of such personal supplies as toothpaste, socks, towels and soap, soft drinks and chocolate bars, and tape recorded music are all part of camp life.

The initial results of the Watts' venture proved encouraging. The 1967 drilling program, which was carried on until late December, resulted in the drilling of 15,000 feet of core revealing a potential 3,500,000 tons of ore graded at 3.48 per cent copper.

Some 50,000 feet of new core was scheduled to be drilled in the 1968 program, which began early in the New Year, as the exploration of the Coppermine area grew in intensity.

Transportation is the key to the Coppermine development. Murray Watts has already demonstrated what private enterprise can do in opening up this last Canadian frontier. The increasing capability of the aircraft as a bulk freight carrier in the Territories has made High Arctic exploration and development possible. The Coppermine venture is designed to show the extraction of the mineral resources of the region is feasible.

The Federal Government shares the enthusiasm of private enterprise for the Coppermine development. It is constructing a permanent air strip near the town of Coppermine to permit year-round movement of passengers and freight to the area.

Movement of ores and concentrates from the Coppermine area is under intensive study. A key factor in the transportation question is the presence of chalcocite as the main constituent of the Coppermine ore bodies. Chalcocite may contain as much as 80% copper. On the other hand, Chalcopyrite, commonly found in other ore bodies, usually contains no more than 35%.

Transportation of Coppermine concentrates, smelting and refining charges would therefore be considerably less because of the smaller amounts of copper concentrates needed to be treated.

Feasibility studies undertaken in 1968 indicated that by careful scheduling, 15,000 tons of concentrates could be shipped from Coppermine in 7,500-ton vessels each year to smelters in Japan or the U.S. west coast.

Ice-locked for most of the year, the passage, running west from Coronation Gulf to Alaska and the Bering Strait, can be navigated for two months each summer. Modern technology is rapidly overcoming former disadvantages. For example, a new icebreaking technique, known as the Alexbow, is being heralded as the answer to northern shipping. This Canadian-designed prow, shaped like a farmer's plough, slices through the ice as easily as a blade carving a furrow in the field. Specially-designed ships, fitted with this prow, could form a cargo fleet to transport ores and concentrates from the Coppermine and other areas in the Arctic archipelago.

Opening up of the Northwest Passage to regular shipping would undoubtedly stimulate other resource developments. Several oil companies have, for instance, found promising showings in the Mackenzie river delta.

Copper is the current attraction in the region, but other mineral showings are exciting the mining world. A lead-silver deposit on Bathurst Inlet has been tested and found to contain high grade ore. Promising gold showings have been found in Melville Sound and on Coronation Gulf, north of the Coppermine staking area.

In the Muskox Intrusion, a geological anomaly in the Coppermine area, geologists have found a wide range of minerals, including nickel, copper, cobalt, platinum and palladium.

Although lying entirely north of the Arctic Circle the Coppermine region is still a hospitable place. Trees, measuring up to 18 inches in diameter, grow along the Coppermine river valley to within 30 miles of the Arctic Ocean, and the rolling plain is a huge colorful carpet of smaller forms of vegetation during the summer.

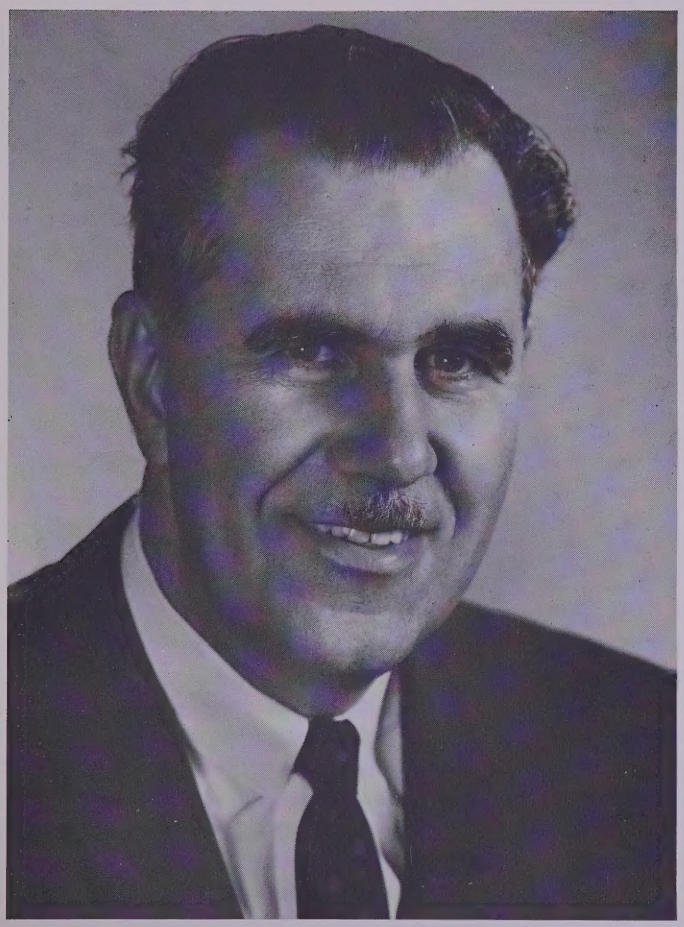
The winters are long and cold, but they seldom reach the extreme low temperatures of some areas in southern Canada. The lowest temperature recorded in Coppermine in the last 30 years was -58 degrees, which is well above the record lows for parts of Northern Ontario and the prairie provinces.

In the summer months the temperature reaches into the high 80s in July and the low 80s in June and August.

"The whole of the North is now on the move," Watts told the 1968 annual meeting of PCE Explorations Limited. "So many troubles of the past are going to disappear with greatly improved transportation and communication during the next few years."

Murray Watts stands well in the forefront of the exploration and development of the mineral wealth of the far northern reaches.

He has found the waiting wealth. He wants others to share it.



S. M. Hodgson, Commissioner of the Northwest Territories

As Canada begins its second century the prospects have never been better for Canadians finally turning northwards to the potentials of their vast Arctic frontier.

Canada has only recently begun to extensively develop the North. Considering our late start, the growth rate in the last ten years has been notable. In 1957 the value of mineral production in the Northwest Territories was just under $22 million. In 1967 the value of metals produced topped $114 million.

All indications are that growth in mineral production will continue and that 1968 will be the greatest year for the north in both production and exploration.

In the Government of the Northwest Territories we are particularly concerned that the indigenous people in the north have a full share in its economic development. We believe that our education system goes a long way towards preparing the young people in the north for an approaching industrial society and that with the cooperation of private industry a truly viable and reliable working force can be established in Canada's Northland.

However, less than 0.15% of Canada's population is now living in the Northwest Territories which comprises about one-third of the country's area. If this land is to be developed and if its potential is to be realized it is essential that Southern Canadians not only invest their money, time and imagination, but that hardy and enterprising men and women come to live and work in the Canadian North.

S. M. Hodgson

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